Finding Bias by Characterizing Wikipedia Editing Behaviours

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Outline

- Introduction
  - Why Wikipedia?, research design, definitions
- Literature Review
  - Intentional manipulation, motivations, systemic bias.
- Analysis Methodology
- Work through example
  - User: QuackGuru
- Other profiles
- Conclusion

Introduction – Why Wikipedia?

- Don Fallis (2008) finds that Wikipedia as epistemological value, with more benefits than consequences:
    - Lack of expertise is countered by Wikipedia's self-awareness and visible labelling for problematic sections and articles
        - In some way, we trust its process as we trust the peer-review process
    - Wikipedia might have a tendency to omit facts or have poor coverage, but accuracy is not significantly worse when compared to Encyclopedia Britannica (Bragues, 2007, as cited in Fallis, 2008)
- Ultimately, Wikipedia has **power** in number of contributors, **speed** in technology, and **accessibility** in technology and public domain access
- This makes it superior to other free and speedy sources of knowledge that would replace Wikipedia for information seeking

Introduction – Why Wikipedia?
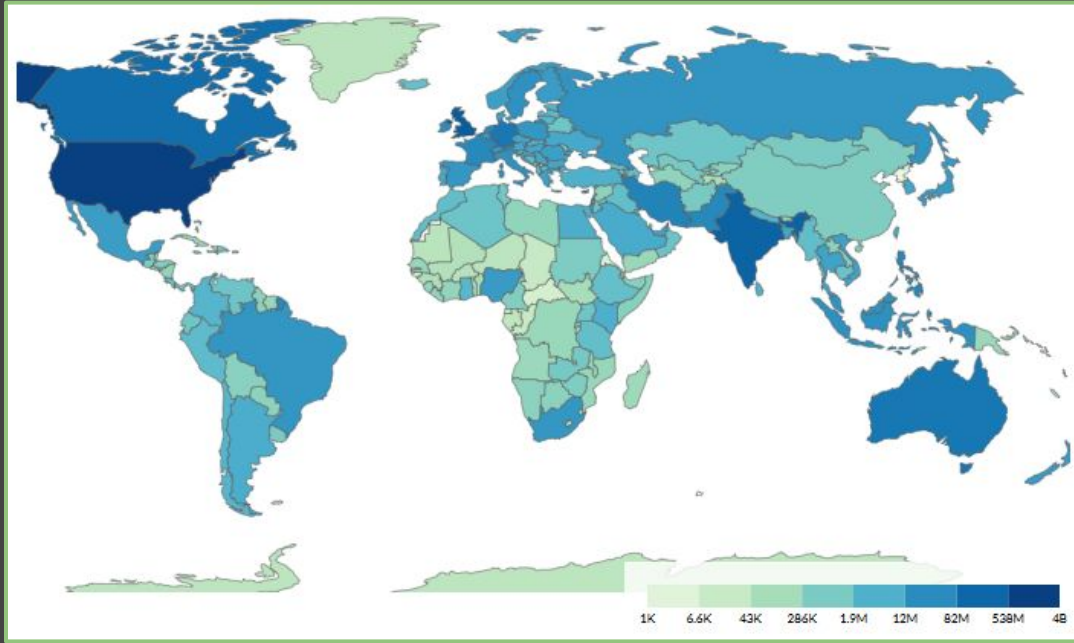
English Wikipedia's page views for January 2020

- United States: 4B
- United Kingdom: 876M
- India: 640M
- Canada: 380M
- Australia 234M

Wikimedia Statistics. (n.d.). Retrieved February 5, 2020 from https://stats.wikimedia.org/v2/#/en.wikipedia.org/reading/page-views-by-country/normal|map|last-month|~total|monthly

Introduction – Research Plan

- RQ: How might we identify intentional bias in Wikipedia editing behaviours?
- Explore a user's edit history to categorize types of edits
  - Some types of edits are assumed more indicative of intentional bias than others: Frequent reverting, claiming or pointing to NPOV, relying on a set of sources
- Build a profile that outlines key characteristics
- Scope: Traditional Chinese Medicine (TCM) articles and their top contributors
- Use WikiMedia tools that have collected and organized contributor data
  - Xtools, Wikiwho
- Main focus is on article history, avoiding talk pages (rabbit holes)
  - Although sometimes rabbit holes hold answers

Introduction – Definitions

- **Bias**: a "one-sided tendency or direction to; to incline to one side; to influence, affect (often unduly or unfairly)" (Oxford University Press, n.d.)
- **Systemic**: "Relating to a system as a whole; inherent in the system" (Oxford University Press, 2015)
- **Systemic Bias**: when a whole system leans to one side
- Wikipedia and researchers are aware of Wikipedia's systemic bias, which manifests in article coverage of particular type
  - Average contributor: white, male, educated, technical, 15-49, English speaking, from Christian country, and in the Northern hemisphere (Wikipedia:Systemic bias, 2020, January 22)
  - E.g., contested reception of Kate Middleton's wedding gown. Jimmy Wales (founder) defended this as a step toward addressing the gender gap, while acknowledging the heavy 'geek' lean of Wikipedia (Bosch, 2012, July 13)
  - Art+Feminism, WikiProject Women in Red are examples of combating systemic bias

Introduction – Definitions

- **Neutrality**: "An intermediate state or condition, not clearly one thing or another; a neutral position, middle ground" (Oxford University Press, 2003)
- Achieved through a trifecta of core values: neutral point of view (NPOV), verifiability, and no original research (Wikipedia:Neutral point of view, February 4, 2020)
- However, Brendan Luyt (2017) studies the conflict resolution process in the Burma/Myanmar article, specifically focused on the title of the article
  - Found that contributors bring a positivist assumption about the definition of an encyclopedia -- that there is one truth to be represented -- which conflicted with any consensus building
  - Instead, perspective bounced between Burma or Myanmar support

Literature Review – Intentional Manipulation

- Unable to find scholarly studies about intentional bias, disinformation, misinformation, or, for good measure, 'fake news'
- Most work on vandalism deals with obvious spam, not subtlety
- Two non-academic experiments include:
  - "How Authoritative is Wikipedia" (2004, September 4) from a personal blog
  - "Experiment concludes: Most misinformation inserted into Wikipedia may persist" (2015, April 13) from *Wikipediocracy*
  - Both used deceptive approaches to hide their disinformation, and found most of their edits remained uncorrected

Literature Review – Editor Motivations

- Since Wikipedia fosters community participation (Kuznetsov, 2006), it has been associated with social motivations:
  - Fun (Nov, 2007)
  - Shared ideology or belonging (Nov, 2007; Xu & Li, 2015)
  - Altruism (Baytiyeh & Pfaffman, 2010; Nov, 2007; Xu & Li, 2015)
- Yang and Lai (2010) do not find evidence of altruism, instead:
  - Feelings of confidence and expertise
  - Contributors already had high "intrinsic motivation"
  - Positive attitude toward Wikipedia's quality and how it operates (2011)
  - Continued editing is strongly influenced by confirmation of expertise and self-satisfaction, as well as a sense of procedural justice (Lai & Yang, 2014)

Literature Review – Editor Motivations cont'd

- Responsibility in shaping perceptions
  - Attendees reported this feeling after an edit-a-thon focused on the Edinburgh Seven, the first women accepted to study medicine at the Edinburgh University (Littlejohn & Hood, 2018)
  - Countering media silence and underrepresentation for Black people (Ju & Stewart, 2019)

Literature Review – Systemic Bias

- Gender (Lam et. al, 2011; Reagle & Rhue, 2011)
  - Women less present in Wikipedia because of confidence, comfort in technical skill and receiving feedback (Bear & Collier, 2016)
  - Hargittai and Shaw (2015) do a dedicated study to technical skill and gender gap correlation
- Cultural bias (Callahan & Herring, 2011)
- Geographical (Graham, Straumann, & Hogan, 2015)
  - Information magnetism makes English Wikipedia and the Western culture a focus for activity regardless of location
- Racial (Ju & Stewart, 2019)

Analysis Methodology

- Uses an exploratory, qualitative, and mixed macro- & micro-perspective approach
- Larger contribution volumes can reach 1,000+ edits
  - WikiMedia's data tools, which aggregate and visualize entire editing histories, are used for a macro level view of contributor's behaviour
  - Approximately 20-30 edits are analyzed in the beginning, middle, and end for micro level
    - Contributor behaviour changes as they move from early stages (staying in the periphery) to later stages (moving towards the centre) (Bryant, Forte, & Bruckman, 2005).
  - Search edit history for key terms: "revert," "NPOV," or others that became interesting during edit history analysis

Example – QuackGuru – Edit Count

| Edits	Page title	Assessment	Links
2,506	Electronic cigarette	Ⓑ B	Log · Page History · Top Edits
1,484	Acupuncture	Ⓑ B	Log · Page History · Top Edits
1,215	Chiropractic	Ⓑ B	Log · Page History · Top Edits
1,124	Larry Sanger	Ⓑ B	Log · Page History · Top Edits
1,008	Safety of electronic cigarettes	Ⓞ Start	Log · Page History · Top Edits
788	Heat-not-burn product	Ⓞ Start	Log · Page History · Top Edits
541	Everipedia	Ⓒ C	Log · Page History · Top Edits
412	Jimmy Wales	Ⓑ B	Log · Page History · Top Edits
405	Construction of electronic cigarettes	Ⓞ Start	Log · Page History · Top Edits
397	Traditional Chinese medicine	Ⓑ B	Log · Page History · Top Edits
321	List of electronic cigarette and e-cigarette liquid brands	Ⓠ Unknown	Log · Page History · Top Edits
312	Nicotine	Ⓑ B	Log · Page History · Top Edits
300	Wikipedia community	Ⓒ C	Log · Page History · Top Edits
299	Regulation of electronic cigarettes	List	Log · Page History · Top Edits
250	2019 outbreak of lung illness linked to vaping products	Ⓒ C	Log · Page History · Top Edits
241	Knowledge Engine (Wikimedia Foundation)	Ⓒ C	Log · Page History · Top Edits
220	Cloud-chasing (electronic cigarette)	Ⓠ Unknown	Log · Page History · Top Edits
220	Chiropractic controversy and criticism	Ⓒ C	Log · Page History · Top Edits

QuackGuru. (n.d.). Xtools. Retrieved February 3, 2020 from https://xtools.wmflabs.org/ec/en.wikipedia.org/QuackGuru
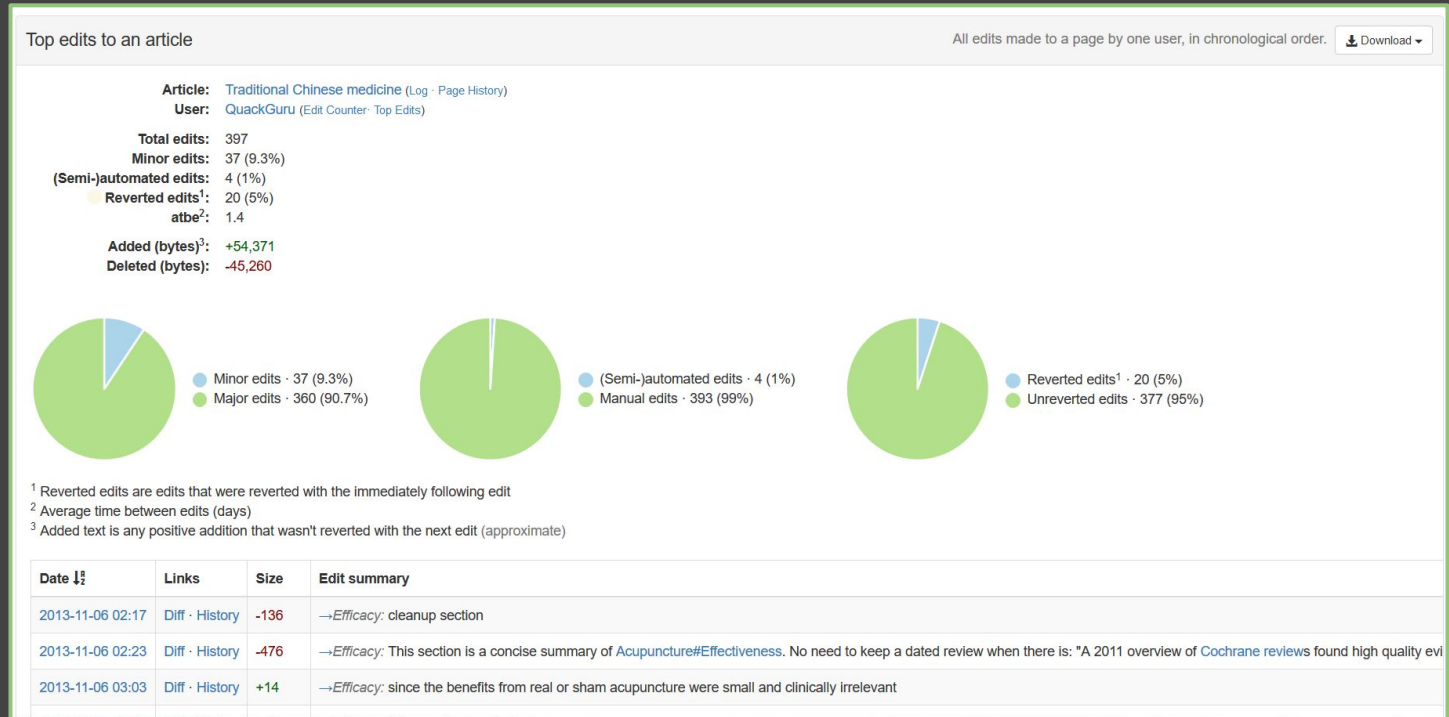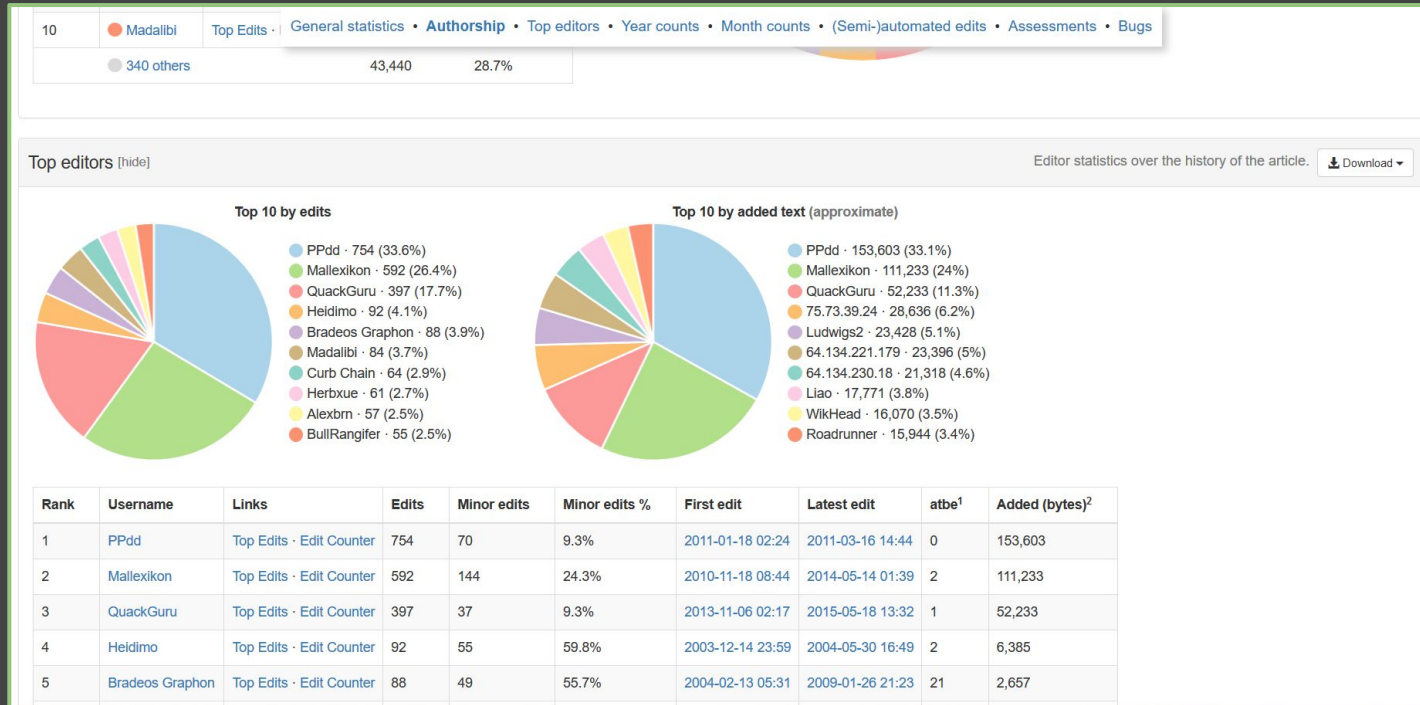
Example – QuackGuru – TCM Edits

Example – QuackGuru – TCM
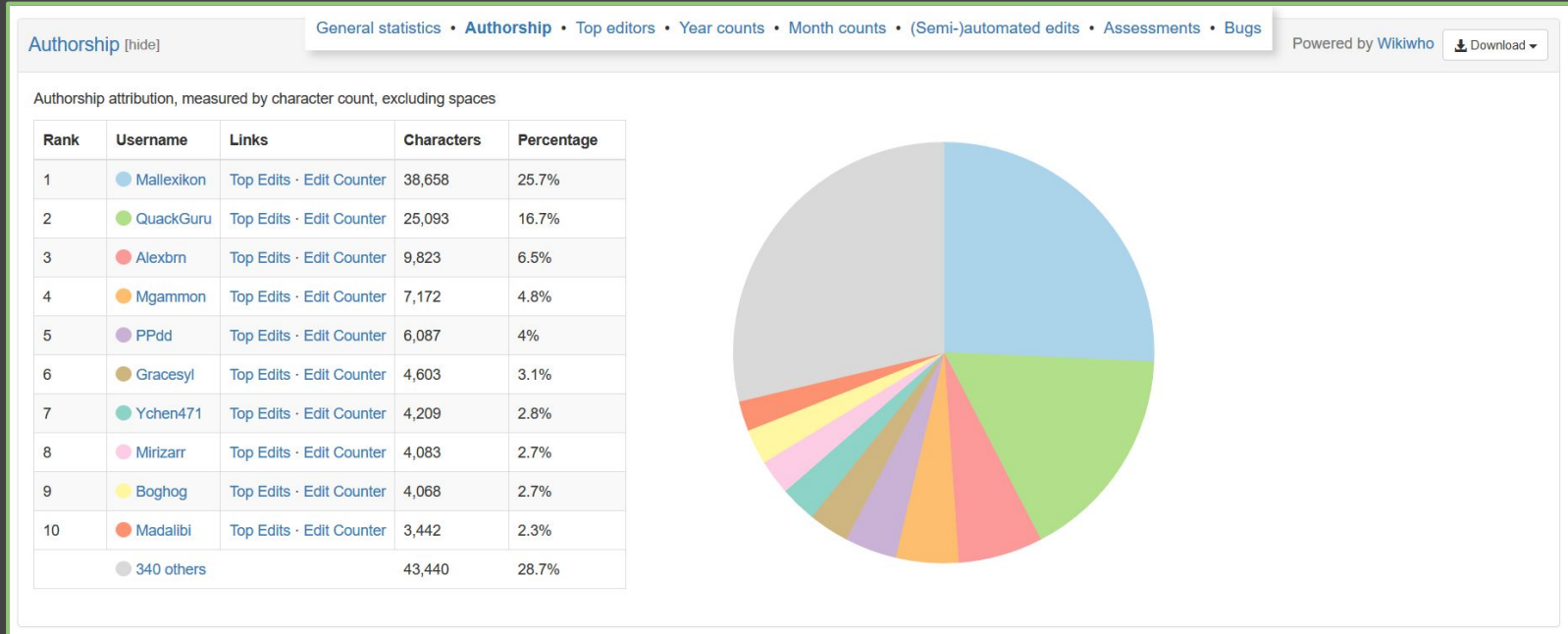
Example – QuackGuru – TCM

Example – QuackGuru – Chinese herbology

Date	Links	Size	Edit summary
2013-11-18 07:56	Diff · History	+47	→*Efficacy*: {{Main|Traditional Chinese medicine#Efficacy}}
2013-12-15 06:40	Diff · History	+3	→*Efficacy*: Further
2013-12-19 02:21	Diff · History	+1,467	expand body and lead
2013-12-19 03:08	Diff · History	-11	→*Efficacy*: fix
2013-12-19 19:57	Diff · History	+873	→*Efficacy*: Cochrane reviews
2013-12-20 20:10	Diff · History	0	→*Efficacy*: grammar
2013-12-28 22:10	Diff · History	0	move text about toxicity to toxicity section
2013-12-28 22:17	Diff · History	+140	→*Toxicity*: expand
2013-12-28 22:24	Diff · History	-55	→*Toxicity*:
2013-12-28 22:30	Diff · History	+318	→*Toxicity*: A 2013 review suggested that although the antimala
2013-12-28 22:38	Diff · History	-40	→*Toxicity*: organise
2013-12-28 22:40	Diff · History	+5	→*Toxicity*: missing word
2013-12-28 22:47	Diff · History	+105	→*Toxicity*: fix
2013-12-28 22:52	Diff · History	-1	→*Toxicity*: placement
2013-12-28 22:54	Diff · History	+4	→*Toxicity*:
2013-12-28 22:58	Diff · History	+8	→*Toxicity*:

Date	Links	Size	Edit summary
2013-12-28 22:58	Diff · History	+8	→*Toxicity*:
2014-03-27 22:10	Diff · History	+222	→*Toxicity*: Edzard Ernst
2014-03-27 22:15	Diff · History	+179	→*Toxicity*: Edzard Ernst again
2014-04-29 17:45	Diff · History	+731	successful results have however been scarce
2014-04-29 17:55	Diff · History	+15	→*Efficacy*: see Drug research
2014-04-29 18:37	Diff · History	+263	→*Ecological impacts*: +ginseng
2014-04-29 18:54	Diff · History	+4	→*Ecological impacts*: grammar
2014-05-26 05:11	Diff · History	+238	summarise body
2014-05-26 05:32	Diff · History	+3	→*Efficacy*: wording
2014-05-26 16:49	Diff · History	+267	*(reverted)* source is reliable
2014-06-05 20:36	Diff · History	-13	*(reverted)* simpler wording
2014-07-21 19:41	Diff · History	-9	neutral wording
2014-07-21 20:02	Diff · History	+6	neutral wording
2014-09-27 19:19	Diff · History	0	herbology
2015-05-12 22:32	Diff · History	-26	preciseness

All times are in UTC.

Chinese herbology. (n.d.). Xtools. Retrieved February 3, 2020 from https://xtools.wmflabs.org/topedits/en.wikipedia.org/QuackGuru/0/Chinese_herbology

Example – Badagnani – Goji

2007-01-30 19:46	Diff · History	+136	→Culinary:
2007-01-30 19:44	Diff · History	+87	→Culinary:
2007-01-30 19:40	Diff · History	+83	→Uses:
2007-01-30 19:38	Diff · History	+8	→United Kingdom:
2007-01-30 19:37	Diff · History	+14	→United Kingdom:
2007-01-30 19:37	Diff · History	-1	→Importance of cultivar:
2007-01-30 19:36	Diff · History	+6	→Importance of cultivar:
2007-01-30 19:35	Diff · History	+106	→China:
2007-01-30 19:28	Diff · History	-1	→External links:
2007-01-30 19:27	Diff · History	+2	→External links:
2007-01-30 19:27	Diff · History	+135	→External links:

Goji. (n.d.). Xtools. Retrieved February 7, 2020 from https://xtools.wmflabs.org/topedits/en.wikipedia.org/Badagnani/0/Goji

Example – QuackGuru's Profile

- Active editor since 2006 with 16.6 average edits per day
- Focuses on citation maintenance (e.g., reliability or date)
- Biased against alternative medicine
  - Focuses on expanding areas such as 'efficacy' and 'toxicity'
  - Uses Quackwatch, a contested source
- Uses medical resources
  - Prefers National Center for Biotechnology Information (NCBI) and Cochrane Reviews
- Despite this, takes NPOV seriously
  - Refers to WP:CLAIM, WP:SYNTH, and conscientious about language connotation
  - Balances own bias against alternative medicine

Example – QuackGuru – TCM

TCM "holds that the body's [[vital energy]] ("chi" or "qi") circulates through channels, called "[[Meridian (Chinese medicine)|meridians]]", that have branches connected to bodily organs and functions."<ref name="Quackwatch"/> Concepts of the body and of disease used in TCM has notions of a superstitious pre-scientific culture, similar to European [[humoral theory]].<ref name=Novella2012/> Scientific investigation has not found any [[histology|histological]] or [[physiology|physiological]] evidence for traditional Chinese concepts such as "qi", meridians, and acupuncture points.{{refn |group=n |name= "SinghErnst2008" |Singh & Ernst (2008) stated, "Scientists are still unable to find a shred of evidence to support the existence of meridians or Ch'i",<ref>{{harvnb|Singh & Ernst|2008|page= 72}}</ref> "The traditional principles of acupuncture are deeply flawed, as there is no evidence at all to demonstrate the existence of Ch'i or meridians"<ref>{{harvnb|Singh & Ernst|2008|page= 107}}</ref> and "Acupuncture points and meridians are not a reality, but merely the product of an ancient Chinese philosophy"<ref>{{harvnb|Singh & Ernst|2008|page= 387}}</ref>}} The TCM theory and practice are not based upon [[scientific knowledge]], and its own practitioners disagree widely on what diagnosis and treatments should be used for any given patient.<ref name="Quackwatch"/> The effectiveness of Chinese herbal medicine remains poorly researched and documented.<ref name="Shang-2007"/> There are concerns over a number of potentially toxic plants, animal parts, and mineral Chinese medicinals.<ref name="Shaw-2012"/> There is a lack of existing [[cost-effectiveness]] research for TCM.<ref name=Zhang2012/> Pharmaceutical research has explored the potential for creating new drugs from traditional remedies, but few successful results have been found.<ref name=swallow/> TCM has been described as mainly [[pseudoscience]], with no logical [[mechanism of action]] for the majority of its treatments.<ref name=swallow/>

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QuackGuru, 02:03 UTC, January 12, 2015
https://en.wikipedia.org/w/index.php?title=Traditional_Chinese_medicine&diff=next&oldid=642093278

Findings – Other Profiles

User:Bradeos Graphon

- Watchful/protective (frequent reverts)
  - Primarily due to administrative activity fighting vandalism
- Particular attention to martial arts, exercises, and philosophy/culture
- Broad attention when in articles
- Suggests TCM expertise
- Focuses on quality of the article through language, monitoring sources and other contributor activity, structure, and formatting
- Makes frequent small edits

User:Badagnani

- 83.4 average edits between 2005-2010
- Low quality additions without always sourcing material
- But also points out unvalidated claims
- Translation
- Although has may edits, they are spread across many articles. Minor contributor.

Findings – Other Profiles cont'd

User:Mallexikon

- Focused on TCM; similar interests as QuackGuru
  - Although more general attention within articles
- High authorship
- Expands from already used sources
- Controls quality by examining sources, reducing redundancy, related article consensus, and structure
- Makes bold deletions
- Translation

User:PPdd

- Unfocused editing
- Low authorship, but high edit count
- Adds content without sources
  - Although adds {{citation needed}} to other unsourced content
- Uses 'weasel wording' e.g., "claims," "believed to be"
- Rephrases & deletes to change meaning, including reliably sourced content
- Takes sources out of context to supplement anti-TCM claims
- Frequently cites policy

Findings – Indicators

Indicators for bias might include:

- Edit warring
- Frequent reverting
- Frequent mention of NPOV and other policies
- High number of edits on a few related articles

Indicators for fair editing might include:

- Refraining from outright deletion of content; opening discussion instead

Conclusions

- WikiMedia's data tools are useful for quick, macro-perspective of a user's editing trends and an article's history
  - However, questions around the authorship statistic remain. Does high authorship imply quality content or control over an article? How can we differentiate?
  - PPdd's low authorship and high edit count was a good indicator that something was weird about the user's behaviour
  - In retrospect, PPdd's lack of progression from first edit to last should also have indicated odd behaviour, since we know contributors change as they grow more comfortable (Bryant, Forte, & Bruckman, 2005)
- Wikipedia's self-reporting edit summary can be useful, misleading, or entirely frustrating
- Indicators of bias can be offset by neutral and conscientious behaviour

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Thank you!

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